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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/775,544	KOMPELLA ET AL.	
	Examiner	Art Unit	
	Vivek Krishnan	2445	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22 and 29-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 29-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This action is responsive to the Amendment/Arguments filed on August 5, 2009. Claims 1-22 and 29-54 are pending.

Response to Arguments

1. Applicant's arguments with respect to Claim Rejections under 35 U.S.C. 103(a) have been fully considered but are not persuasive and/or are moot in view of the new ground(s) of rejection.

As to Applicant's arguments with respect to Claims 1, 11, 18, 29, 39, and 46:

a. Applicant argues that neither Moy nor Sandick disclose at least two indicators, each indicator identifying a different one of the at least two different interfaces and corresponding forwarding liveness status information of the at least two different interfaces as data within the aggregated message, such that the forwarding liveness status information includes the integrity and correct operation of forwarding tables.

Applicant's arguments are moot in view of the new ground(s) of rejection.

As to Applicant's arguments with respect to Claims 51 and 53:

b. Applicant argues that Moy and Sandick do not teach or suggest providing status information that an interface monitor is not reporting.

Examiner respectfully disagrees. Moy's disclosure indicating a downed interface means that the local interface monitor is not/cannot be reporting.

As to Applicant's arguments with respect to Claims 17, 22, 45, and 50:

In view of Examiner's arguments with respect to Claims 11, 18, 39, and 46, Applicant's arguments are not persuasive.

As to Applicant's arguments with respect to Claims 52 and 54:

In view of Examiner's arguments with respect to Claims 1 and 11, Applicant's arguments are not persuasive.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-16, 18-21, 29-44, 46-49, 51, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Network Working Group RFC 1583: OSPF Version 2 to Moy (hereinafter "Moy"), Network Working Group Internet Draft: Fast LIveness Protocol (FLIP) to Sandick et al. (hereinafter "Sandick") (IDS submitted on July 12, 2004), U.S. Patent Application Publication No. 2004/0121792 to Allen et al. (hereinafter "Allen"), and U.S. Patent No. 7,417,987 to Shenoy et al. (hereinafter "Shenoy").

4. As to Claims 1 and 29, Moy discloses a computer-implemented method and elements (referenced hereinafter as the method) comprising:

a) accepting forwarding liveness status information [...] (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses accepting interface and link status information for a link state advertisement. See also, Moy; 9.0 The Interface Data Structure, which discloses accepting interface and link status information for a hello message);

b) composing a message including the forwarding liveness status information (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses composing a link state advertisement including the interface and link status information. See also, Moy; 9.0 The Interface Data Structure, which discloses composing a hello message including the interface and link status information); and

c) sending the message towards a neighbor node (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses sending the link state advertisements to neighboring routers. See also, Moy; 9.0 The Interface Data Structure, which discloses sending the hello message to neighboring routers).

Moy does not explicitly disclose, however Sandick discloses accepting forwarding liveness status information of at least two different interfaces and composing an aggregated message with the status information of the at least two different interfaces as data within the

aggregated message (Sandick; 4.2 Parameters and B.1 FLIP Advertisement Message, list of neighbor interfaces).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify accepting status information of an interface, as disclosed by Moy, to include accepting status information of at least two different interfaces, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

Moy does not explicitly disclose, however Allen discloses explicitly indicating the status of neighbors in topology discovery messages (Allen; paragraph 29; binary flags explicitly indicating the status of neighbor protocols).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify implicitly indicating the status of multiple interfaces of a node, as disclosed by Moy and Sandick, to include explicitly indicating the statuses, as disclosed by Allen, in order to apply the discovery taught in Moy to networks with heterogeneous topologies.

Moy does not explicitly disclose, however Shenoy discloses forwarding liveness status information includes an integrity and correct operation of a forwarding table used by the data forwarding device (Shenoy; column 5 lines 15-17, column 6 lines 45-48, column 8 line 66 – column 9 line 3; discloses forwarding information includes correct forwarding table information used to correct errors and update forwarding tables).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify forwarding liveness status information, as disclosed by Moy, to include an integrity and correct operation of a forwarding table used by the data forwarding device, as disclosed by Shenoy, in order to distribute reliable forwarding information.

5. As to Claims 2 and 30, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 1 and 29. Moy further discloses

d) (means for) maintaining a first timer for tracking a send time interval, wherein the acts of composing the aggregated message and sending the aggregated message are performed after expiration of the first timer (Moy; 9.0 The Interface Data Structure, discloses maintaining a Hello Timer for tracking a HelloInterval, wherein hello messages are composed and sent when the timer expires); and

e) (means for) restarting the first timer after the aggregated message is sent (Moy; 9.0 The Interface Data Structure, discloses restarting the Hello Timer after the message is sent).

6. As to Claims 3 and 31, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 2 and 30. Moy further discloses wherein the aggregated message further includes a dead time interval, and wherein the send time interval is less than the dead time interval (Moy; 9.0 The Interface Data Structure, discloses a RouterDeadInterval, which is greater than the HelloInterval).

7. As to Claims 4 and 32, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 2 and 30. Moy further discloses wherein the aggregated message further includes a dead time interval (Moy; 9.0 The Interface Data Structure, discloses a RouterDeadInterval),

Sandick further discloses wherein the send time interval is no more than one third of the dead time interval (Sandick; 4.2 Parameters, discloses a PeerDeadInterval, wherein the PeerDeadInterval is at least 3 times the HelloInterval).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the message including a dead time interval, as disclosed by Moy, to include a dead time interval which is greater than 3 times the send time interval, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

8. As to Claims 5 and 33, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 2 and 30. Sandick further discloses wherein the send time interval is less than one second (Sandick; 7.2 HelloInterval, discloses the HelloInterval has a default value of 3ms).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the send time interval, as disclosed by Moy, to include a send time interval that is less than one second, as disclosed by Sandick. One of ordinary skill in the art at the time

the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

9. As to Claims 6 and 34, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 2 and 30. Sandick further discloses wherein the send time interval is less than 100 msec (Sandick; 7.2 HelloInterval, discloses the HelloInterval has a default value of 3ms).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the send time interval, as disclosed by Moy, to include a send time interval that is less than 100 ms, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

10. As to Claims 7 and 35, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 1 and 29. Moy further discloses wherein the aggregated message further includes a dead time interval (Moy; 9.0 The Interface Data Structure, discloses a RouterDeadInterval).

11. As to Claims 8 and 36, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 1 and 29. Moy further discloses wherein the act of (means for) sending the aggregated message includes (means for) providing the aggregated message in an Internet

protocol packet (Moy; 1.1 Protocol Overview, discloses OSPF messages being provided in IP packets).

12. As to Claims 9 and 37, Moy and Sandick disclose each and every limitation of claims 8 and 36. Moy further discloses wherein the aggregated message is sent (the means for sending the message) towards the neighbor node by (include means for) setting a destination address in the Internet protocol packet to a multicast address associated with routers that support interface forwarding liveness (Moy; 1.0 Introduction, discloses sending the IP messages using multicast).

13. As to Claims 10 and 38, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 1 and 29. Moy further discloses wherein the status information includes a forwarding liveness state selected from a group of forwarding liveness states consisting of

(A) interface up (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceUp. See also, Moy; 9.0 The Interface Data Structure, which discloses receiving a hello messages within the RouterDeadInterval serves as indication that the neighbor interface is up),

(B) interface down (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceDown. See also, Moy; 9.0 The Interface Data Structure, which discloses the failure to receive hello messages within the RouterDeadInterval serves as indication that the neighbor interface is down),

(C) interface monitor not reporting, and

(D) forwarding engine restarting.

14. As to Claims 11 and 39, Moy discloses for use with a node, a computer-implemented method (elements) comprising:

a) (means for) receiving a message including

i) forwarding liveness status information […] (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses receiving a link state advertisement including interface and link status information. See also, Moy; 9.0 The Interface Data Structure, which discloses receiving a hello message including interface and link status information), and

ii) a time interval (Moy; 9.0 The Interface Data Structure, which discloses receiving a hello message including a PeerDeadInterval); and

b) (means for) updating neighbor node forwarding liveness status information using the message (Moy; 12.2 Link State Database, discloses updating neighbor router interface and link status information using the link state advertisement. See also, Moy; 9.0 The Interface Data Structure, which discloses updating neighbor router interface and link status information using the hello message).

Moy does not explicitly disclose, however Sandick discloses the aggregated message including forwarding liveness status information for a first set of at least two different interfaces

as data within the aggregated message (Sandick; 4.2 Parameters and B.1 FLIP Advertisement Message, list of neighbor interfaces).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify accepting status information of an interface, as disclosed by Moy, to include accepting status information of at least two different interfaces, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

Moy does not explicitly disclose, however Allen discloses explicitly indicating the status of neighbors in topology discovery messages (Allen; paragraph 29; binary flags explicitly indicating the status of neighbor protocols).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify implicitly indicating the status of multiple interfaces of a node, as disclosed by Moy and Sandick, to include explicitly indicating the statuses, as disclosed by Allen, in order to apply the discovery taught in Moy to networks with heterogeneous topologies.

Moy does not explicitly disclose, however Shenoy discloses forwarding liveness status information includes an integrity and correct operation of a forwarding table used by the data forwarding device (Shenoy; column 5 lines 15-17, column 6 lines 45-48, column 8 line 66 – column 9 line 3; discloses forwarding information includes correct forwarding table information used to correct errors and update forwarding tables).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify forwarding liveness status information, as disclosed by Moy, to include an integrity and correct operation of a forwarding table used by the data forwarding device, as disclosed by Shenoy, in order to distribute reliable forwarding information.

15. As to Claims 12 and 40, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 11 and 39. Moy further discloses wherein the act of (means for) updating neighbor node liveness status information includes

i) (means for) setting a first timer to the time interval and starting the first timer (Moy; 9.0 The Interface Data Structure, discloses setting a Wait Timer to the RouterDeadInterval and starting the Wait Timer),

ii) if the first timer expires, (means for) setting a status [...] of the neighbor node to down (Moy; 9.0 The Interface Data Structure and 9.2 Events Causing Interface State Changes, discloses setting a status of an interface of the neighbor router to down if the Wait Timer expires); and

iii) (means) if a further message, sourced from the neighbor node, and including A) forwarding liveness status information, and B) a new time interval, is received then, resetting the first timer to the new time interval and restarting the first timer (Moy; 9.0 The Interface Data Structure and 9.2 Events Causing Interface State Changes, discloses if a hello message including a RouterDeadInterval is received, resetting the Wait Timer to the RouterDeadInterval and restarting the Wait Timer).

Sandick further discloses setting the status of each of the at least two different interfaces of the neighbor node to down if the first timer expires (Sandick; 4.1 Neighbor Discovery, 4.2 Parameters, 4.5 FLIP Advertisement Protocol Description, and B.1 FLIP Advertisement Message, list of neighbor interfaces and setting neighbor interface adjacencies to down).

Allen further discloses explicitly indicating the status of neighbors in topology discovery messages (Allen; paragraph 29; binary flags explicitly indicating the status of neighbor protocols).

16. As to Claims 13 and 41, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 12 and 40. Moy does not explicitly disclose, but Sandick discloses wherein each of the time interval and the new time interval is less than one second (Sandick; 7.3 PeerDeadInterval, discloses PeerDeadInterval default value is 12 ms).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the time interval, as disclosed by Moy, to include a time interval that is less than one second, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

17. As to Claims 14 and 42, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 11 and 39. Moy further discloses wherein the forwarding liveness status information is interface forwarding liveness status information (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link

State Advertisements, discloses the link state advertisement includes interface status information).

18. As to Claims 15 and 43, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 11 and 39. Moy further discloses wherein the status information includes a forwarding liveness state selected from a group of forwarding liveness states consisting of

(A) interface up (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceUp. See also, Moy; 9.0 The Interface Data Structure, which discloses receiving a hello messages within the RouterDeadInterval serves as indication that the neighbor interface is up),

(B) interface down (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceDown. See also, Moy; 9.0 The Interface Data Structure, which discloses the failure to receive hello messages within the RouterDeadInterval serves as indication that the neighbor interface is down),

(C) interface monitor not reporting, and

(D) forwarding engine restarting.

19. As to Claims 16 and 44, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 11 and 39. Moy further discloses wherein the forwarding liveness status information includes at least one of

(i) the integrity and correct operation of switch fabric (Moy; 12.0-12.4 Link State Advertisements, discloses the link state advertisement includes link status information),

(ii) the integrity and correct operation of a forwarding lookup engine,

(iii) the integrity and correct operation of a traffic scheduler,

(iv) the integrity and correct operation of a traffic classifier,

(v) the integrity and correct operation of buffers in the data plane,

(vi) the integrity and correct operation of packet segmentation modules,

(vii) the integrity and correct operation of packet reassembly modules,

(viii) the integrity and correct operation of packet re-sequencing modules,

(ix) whether or not a node is restarting,

(x) whether or not the forwarding plane is congested, and

(xi) the integrity and correct operation of fragmentation modules.

20. As to Claims 18 and 46, Moy discloses a computer-implemented method for monitoring interface forwarding liveness, the method (a system) comprising:

a) (means for) determining, at a first node, forwarding liveness status information for [...] interface (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses determining, at a first node, interface and link status information for a link state advertisement. See also, Moy; 9.0 The Interface Data Structure, which discloses determining, at a first node, interface and link status information for a hello message);

b) (means for) sending, from the first node, a message including the determined status information (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses sending, from the first node, a link state advertisement including the interface and link status information. See also, Moy; 9.0 The Interface Data Structure, which discloses sending, from the first node, a hello message including the interface and link status information);

c) (means for) receiving, at the second node, the message (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, 9.3 The Interface State Machine, and 12.0-12.4 Link State Advertisements, discloses receiving, at a second node, the link state advertisement. See also, Moy; 9.0 The Interface Data Structure, which discloses receiving, at a second node, the hello message); and

d) (means for) updating, by the second node, first node forwarding liveness status information using the message (Moy; 12.2 Link State Database, discloses updating, by the second node, first node interface and link status information using the link state advertisement. See also, Moy; 9.0 The Interface Data Structure, which discloses updating, by the second node, first node interface and link status information using the hello message).

Moy does not explicitly disclose, however Sandick discloses determining, at a first node, forwarding liveness status information for at least two different interfaces and sending an aggregated message including the status information as data within the aggregated message (Sandick; 4.1 Neighbor Discovery, 4.2 Parameters, 4.5 FLIP Advertisement Protocol Description, and B.1 FLIP Advertisement Message, list of neighbor interfaces).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify accepting status information of an interface, as disclosed by Moy, to include accepting status information of at least two different interfaces, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

Moy does not explicitly disclose, however Allen discloses explicitly indicating the status of neighbors in topology discovery messages (Allen; paragraph 29; binary flags explicitly indicating the status of neighbor protocols).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify implicitly indicating the status of multiple interfaces of a node, as disclosed by Moy and Sandick, to include explicitly indicating the statuses, as disclosed by Allen, in order to apply the discovery taught in Moy to networks with heterogeneous topologies.

Moy does not explicitly disclose, however Shenoy discloses forwarding liveness status information includes an integrity and correct operation of a forwarding table used by the data forwarding device (Shenoy; column 5 lines 15-17, column 6 lines 45-48, column 8 line 66 – column 9 line 3; discloses forwarding information includes correct forwarding table information used to correct errors and update forwarding tables).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify forwarding liveness status information, as disclosed by Moy, to include an

integrity and correct operation of a forwarding table used by the data forwarding device, as disclosed by Shenoy, in order to distribute reliable forwarding information.

21. As to Claims 19 and 47, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 18 and 46. Moy further discloses wherein the aggregated message further includes a dead interval (Moy; 9.0 The Interface Data Structure, discloses a RouterDeadInterval included in a hello message), and wherein the act of (means for) updating first node forwarding liveness status information includes

i) (means for) setting a timer to the dead interval (Moy; 9.0 The Interface Data Structure, discloses setting a Wait Timer to the RouterDeadInterval);

ii) (means for) starting the timer (Moy; 9.0 The Interface Data Structure, discloses starting the Wait Timer);

iii) (means for) determining whether or not a further message including forwarding liveness status information is received from the first node before the expiration of the timer (Moy; 9.0 The Interface Data Structure and 9.2 Events Causing Interface State Changes, discloses determining whether a further hello message is received from the first node before the Wait Timer expires); and

iv) if it is determined that a further message including forwarding liveness status information is not received from the first node by the second node before the expiration of the timer, then (means for) informing the second node that the [...] interface of the first node is down (Moy; 9.0 The Interface Data Structure and 9.2 Events Causing Interface State Changes,

discloses if it is determined that a further hello message is not received from the first node before the expiration of the Wait Timer, then informing the second node that the interface of the first node is down).

Moy does not explicitly disclose, however Sandick discloses if it is determined that a further message including forwarding liveness status information is not received from the first node by the second node before the expiration of the timer, then informing the second node that the at least two different interfaces of the first node are down (Sandick; 4.1 Neighbor Discovery, 4.2 Parameters, 4.5 FLIP Advertisement Protocol Description, and B.1 FLIP Advertisement Message, list of neighbor interfaces and setting neighbor interface adjacencies to down).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify accepting status information of an interface, as disclosed by Moy, to include accepting status information of at least two different interfaces, as disclosed by Sandick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to facilitate fast neighbor or peer interface failure detection (Sandick; Abstract).

22. As to Claims 20 and 48, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 18 and 46. Moy further discloses wherein the status information includes a forwarding liveness state selected from a group of forwarding liveness states consisting of

(A) interface up (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceUp. See also, Moy; 9.0 The Interface Data Structure, which

discloses receiving a hello messages within the RouterDeadInterval serves as indication that the neighbor interface is up),

(B) interface down (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceDown. See also, Moy; 9.0 The Interface Data Structure, which discloses the failure to receive hello messages within the RouterDeadInterval serves as indication that the neighbor interface is down),

(C) interface monitor not reporting, and

(D) forwarding engine restarting.

23. As to Claims 21 and 49, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 18 and 46. Moy further discloses wherein the forwarding liveness status information includes at least one of

(i) the integrity and correct operation of switch fabric (Moy; 12.0-12.4 Link State Advertisements, discloses the link state advertisement includes link status information),

(ii) the integrity and correct operation of a forwarding lookup engine,

(iii) the integrity and correct operation of a traffic scheduler,

(iv) the integrity and correct operation of a traffic classifier,

(v) the integrity and correct operation of buffers in the data plane,

(vi) the integrity and correct operation of packet segmentation modules,

(vii) the integrity and correct operation of packet reassembly modules,

(viii) the integrity and correct operation of packet re-sequencing modules,

(ix) whether or not a node is restarting,

(x) whether or not the forwarding plane is congested, and

(xi) the integrity and correct operation of fragmentation modules.

24. As to Claims 51 and 53, Moy, Sandick, Allen, and Shenoy disclose the computer-implemented method of Claims 1 and 29. Moy further discloses wherein the forwarding liveness status information of at least one of the at least two different interfaces included in the aggregated message includes a forwarding liveness state set to interface monitor not reporting (Moy; 9.1 Interface States, 9.2 Events Causing Interface State Changes, and 9.3 The Interface State Machine, discloses the link state advertisement includes interface state information, including InterfaceDown. See also, Moy; 9.0 The Interface Data Structure, which discloses the failure to receive hello messages within the RouterDeadInterval serves as indication that the neighbor interface is down, a down state indicates that the interface is not reporting).

25. Claims 17, 22, 45, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moy, Sandick, Allen, and Shenoy as applied to claims 11, 18, 39, and 46 above, and further in view of Network Working Group RFC 1989: PPP Link Quality Monitoring published on August 1996 by Simpson (denoted herein as "Simpson") (IDS submitted on February 10, 2004).

26. As to Claims 17 and 45, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 11 and 39. Moy does not explicitly disclose, however Simpson discloses wherein the forwarding liveness status information includes at least one of

(i) bit error rate at a link interface (Simpson; 2.6 Packet Format, 2.7 Calculations, and 2.9 Failure Detection, discloses sending status information including indication of the error rate of packets at a link interface), and

(ii) clock synchronization at a link interface.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the forwarding liveness status information, as disclosed by Moy, to include bit error rate at a link interface, as disclosed by Simpson. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to monitor the quality of a link (Simpson; 1.0 Introduction).

27. As to Claims 22 and 50, Moy, Sandick, Allen, and Shenoy disclose each and every limitation of claims 18 and 46. Moy does not explicitly disclose, however Simpson discloses wherein the forwarding liveness status information includes at least one of

(i) bit error rate at a link interface (Simpson; 2.6 Packet Format, 2.7 Calculations, and 2.9 Failure Detection, discloses sending status information including indication of the error rate of packets at a link interface), and

(ii) clock synchronization at a link interface.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the forwarding liveness status information, as disclosed by Moy, to include

bit error rate at a link interface, as disclosed by Simpson. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to monitor the quality of a link (Simpson; 1.0 Introduction).

28. Claims 52 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moy, Sandick, Allen, and Shenoy as applied to claims 1 and 29 above, and further in view of U.S. Patent No. 7,362,700 to Frick et al. (hereinafter "Frick").

29. As to Claims 52 and 54, Moy, Sandick, Allen, and Shenoy disclose the computer-implemented method of Claims 1 and 29. Moy and Sandick do not explicitly disclose, however Frick discloses wherein the forwarding liveness status information of at least one of the at least two different interfaces included in the aggregated message includes a forwarding liveness state set to forwarding engine restarting (Frick; column 1 lines 60-63; LSA announces intent to perform a restart).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the forwarding liveness status information, as disclosed by Moy, to include an indication of restarting, as disclosed by Frick. One of ordinary skill in the art at the time the invention was made would have been motivated to make this combination in order to perform a hitless restart.

Conclusion

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vivek Krishnan whose telephone number is (571) 270-5009. The examiner can normally be reached on Monday through Friday from 9:00 AM to 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on (571) 272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/V. K./
Examiner, Art Unit 2445

/Rupal D. Dharia/
Supervisory Patent Examiner, Art Unit 2400